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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/867,998	05/29/2001	Charles A. Shermer	W2K1004	7360

23504 7590 06/24/2003
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EXAMINER

NGUYEN, DILINH P

ART UNIT PAPER NUMBER

2814

DATE MAILED: 06/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/867,998

Applicant(s)

SHERMER, CHARLES A.

Examiner

DiLinh Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 April 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4-8,10-14 and 24-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4-8,10-14 and 24-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION***Drawings***

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, a die coupled to the leadframe; a mold compound for encapsulating the semiconductor assembly wherein the mold compound flows into the channels and bonds with the channels forming a lock between the mold compound and the leadframe and the plurality of second raised areas allow the mold compound to get underneath the wirebonds and capture the wirebonds must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada et al. (U.S. Pat. 6177725) in view of Huang (U.S. Pat. 6396139).

- Regarding claims 1 and 14, Yamada et al. disclose a semiconductor device (figs. 4a-5, column 5, lines 25 et seq.) comprising:

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a lead frame 31;

a die 32 coupled to the lead frame;

a plurality of grooves 38a (column 5, lines 30-32) formed in a top surface of the leadframe for promoting adhesion;

a mold compound 36 for encapsulating the semiconductor assembly and it would have been obvious that the mold compound flows into the plurality of grooves and bonds with the plurality of grooves forming a lock between the mold compound and the leadframe to prevent delamination of the semiconductor assembly.

Yamada et al. fail to disclose a first raised area and a plurality of second raised areas on the leadframe.

Huang discloses a semiconductor device (fig. 4, column 4, lines 14-24) comprising:

a first raised area 51b on the leadframe where a die is coupled; and

a plurality of second raised areas 50b on the leadframe used for wirebonds wherein the plurality of second raised areas obviously allow the mold compound 7b to get underneath the wirebonds and capture the wirebonds to increase reliability of the wirebonds. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Yamada et al. to assure in quality and reliability and less complex to implement, as shown by Huang.

3. Claims 4-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada et al. in view of Huang and further in view of Nakamichi (U.S. Pat. 6127206).

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- Regarding claims 4-7, Yamada et al. and Huang disclose the claimed invention except for not point out that the grooves are triangle or U shaped and the grooves are formed by stamping and coining or etching.

Nakamichi discloses the lead 16 is formed with a groove 18, wherein the groove 18 has a "V" shaped in cross section (fig. 2, column 5, lines 1-5) and "U" shaped (fig. 5); and the groove is formed by coining or etching (column 6, lines 54-59) to increase the lead bonding strength and prevent the lead from being pulled out of the encapsulation (column 5, lines 12-15 and 6, lines 47-48). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Yamda et al. and Huang to increase the lead bonding strength and prevent the lead from being pulled out of the encapsulation, as shown by Nakamichi.

Additionally, the process limitation "the at least channel is formed by stamping, coining and etching the leadframe" in claims 6-7, do not carry weight in a claim drawn to structure. In re Thorpe, 277 USPQ 964 (Fed. Cir. 1985).

4. Claims 8, 11 and 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada et al. (U.S. Pat. 6177725).

- Regarding claims 8 and 24-25 Yamada et al. disclose a semiconductor device (figs. 4a-5, column 5, lines 25 et seq.) comprising:
 - a lead frame 31;
 - a die 32 coupled to the leadframe;
 - at least one groove 38a (column 5, lines 30-32) formed in a top surface of the leadframe wherein the at least one channel obviously prevents delamination of the

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semiconductor package by allowing a mold compound 36 to flow into the at least one groove and bonds with the at least one groove forming a lock between the mold compound and the leadframe.

- Regarding claim 11, Yamada et al. disclose a plurality of grooves 38a formed in the top surface of the leadframe.

5. Claims 10 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada et al. (U.S. Pat. 6177725) in view of Huang (U.S. Pat. 6396139).

Yamada et al. fail to disclose a first raised area and a plurality of second raised areas on the leadframe.

Huang discloses a semiconductor device (fig. 4, column 4, lines 14-24) comprising:

a first raised area 51b on the leadframe forming a die pad; and

a plurality of second raised areas 50b on the leadframe used for wirebonds wherein the plurality of second raised areas obviously allow the mold compound 7b to get underneath the wirebonds and capture the wirebonds. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Yamada et al. to assure in quality and reliability and less complex to implement, as shown by Huang.

6. Claims 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada et al. in view of Nakamichi (U.S. Pat. 6127206).

Yamada et al. disclose the claimed invention except for not point out that the grooves are triangle or U shaped.

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Nakamichi discloses the lead 16 is formed with a groove 18, wherein the groove 18 has a "V" shaped in cross section (fig. 2, column 5, lines 1-5) and "U" shaped (fig. 5) to increase the lead bonding strength and prevent the lead from being pulled out of the encapsulation (column 5, lines 12-15 and 6, lines 47-48). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Yamda et al. to increase the lead bonding strength and prevent the lead from being pulled out of the encapsulation, as shown by Nakamichi.

7. Claims 8, 11,13-14, 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Minamio et al. (U.S. Pat. 6208020).

Minamio et al. disclose the semiconductor device (figs. 1a-1b) comprising:

a leadframe 2 and 1;

a die 4 coupled to the leadframe;

a plurality of channels formed in the top surface of the leadframe 1; wherein the channels are "U" shaped and the channels obviously prevents delamination of the semiconductor package by allowing a mold compound 6 to flow into the at least one channel and bonds with the channels forming a lock between the mold compound and the leadframe;

a raised area 2a on the leadframe forming a die pad and means for allowing a mold compound 6 to get underneath wirebonds on the leadframe section 1 and capture the wirebonds.

8. Claims 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada et al. in view of Nakamichi (U.S. Pat. 6127206).

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Yamada et al. disclose the claimed invention except for not point out that the means is formed by stamping, coining and etching the leadframe.

Nakamichi discloses the lead 16 is formed with a groove 18, wherein the groove 18 has a "V" shaped in cross section (fig. 2, column 5, lines 1-5) and "U" shaped (fig. 5); and the groove is formed by coining or etching (column 6, lines 54-59) to increase the lead bonding strength and prevent the lead from being pulled out of the encapsulation (column 5, lines 12-15 and 6, lines 47-48). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Yamda et al. to increase the lead bonding strength and prevent the lead from being pulled out of the encapsulation, as shown by Nakamichi.

Additionally, the process limitation "the at least channel is formed by stamping, coining and etching the leadframe" in claims 27-28, do not carry weight in a claim drawn to structure. *In re Thorpe*, 277 USPQ 964 (Fed. Cir. 1985).

Response to Arguments

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the grooves are formed on the entire lead frame but not on the die pad) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

In response to applicant's argument that there is not obvious to combine the references, the test for obviousness is not whether the features of a secondary

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reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

Applicant's arguments filed 4/28/03 have been fully considered but they are not persuasive.

- The applicant argues that applicant does not have grooves on the die pad.

The examiner respectfully disagrees.

Applicant's figs. 1 and 2 disclose that the grooves 12 are formed on the entire die flag 10 including the die pad area.

- The applicants argues that Yamada et al. fail to disclose that the channels on the top surface of the lead frame.

Yamada et al. disclose a semiconductor device (figs. 4a-5, column 5, lines 25 et seq.) comprising:

a lead frame 31 (element 31 is a portion of a lead frame);

a die 32 coupled to the lead frame;

a plurality of grooves 38a (column 5, lines 30-32) formed in a top surface of the lead frame for promoting adhesion.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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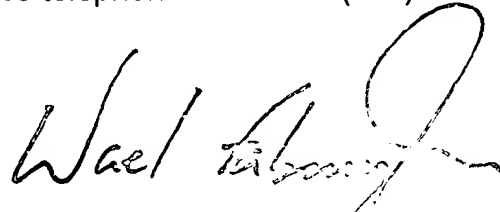
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DiLinh Nguyen whose telephone number is (703) 305-6983. The examiner can normally be reached on 8:00AM - 6:00PM (M-F).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (703) 308-4918. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

DLN
June 18, 2003


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